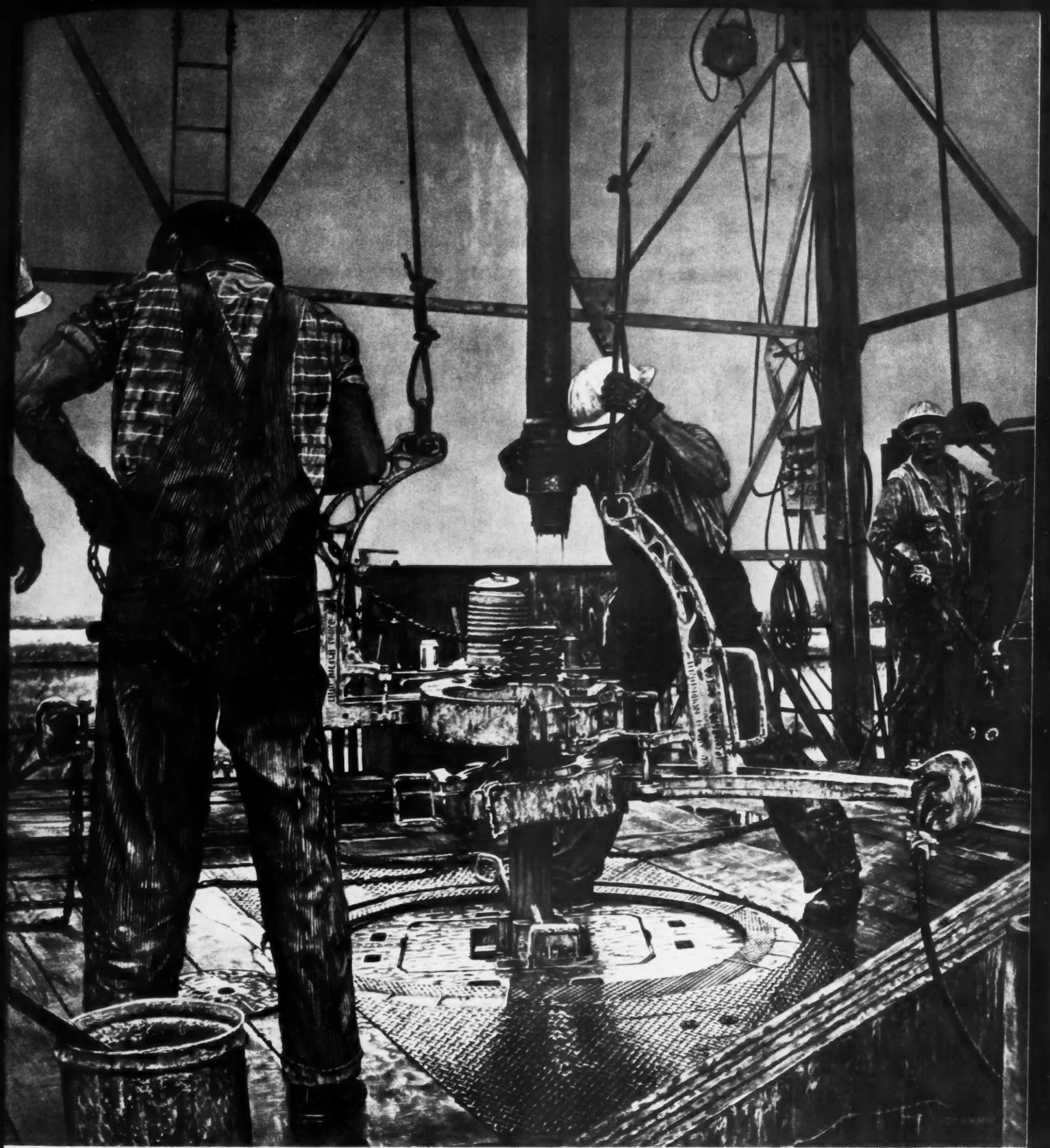

Going in the Hole — *Bob Wygant*

The HUMBLE WAY

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Progress in Oil Finding

We are not running out of oil, but finding it is more expensive and complicated than ever

By MORGAN J. DAVIS*

THE exploratory efforts of the petroleum industry—and their success or failure—constitute the very foundation upon which rests the future course of our industry. Thus a report on recent results in oil and gas exploration as interpreted from published data and from personal studies seems timely.

The question of how much progress has been made in oil and gas finding in the last five to ten years is, of course, one which is continually arising among oilmen and particularly among exploration people. Oddly enough, it is seldom answered the same way in any two discussions. Some continually reiterate that oil is becoming harder to find, and that we are falling behind in our task. Some stress the declining size of our present day discoveries. Others are preoccupied with increased costs but point to our large reserves as evidence of satisfactory finding results. With essentially the same facts in front of us, some of us are pessimists, some optimists. What *are* some of the facts bearing on this question?

First of all, perhaps, we should remember that in recent years the task of keeping the *supply of oil* ahead of the *demand for oil* has not been an easy or a simple one. Our country uses ten times as much mechanical energy as the rest of the world, and upon the petroleum twins—oil and gas—falls the burden of providing a large proportion of that energy. Petroleum, in fact, currently supplies about 60 per cent of our mineral energy, coal (once America's No. 1 source of energy) having dropped far behind as a competitive fuel.

All this has resulted in a high demand for oil. Last year our domestic consumption of petroleum products soared to an all-time high of about two and a half billion barrels—about a billion barrels more than of 1940. Oil finding has, however, more than kept pace with this unprecedented demand. A few weeks ago the American Petroleum Institute released its 1952 year-end reserve figures, and these showed a large addition to national reserves of crude oil and other liquid hydrocarbons. Proved reserves of petroleum liquids increased 764 million barrels over 1951's former peak. This increase in reserves might have been even higher had there been no shortage of pipe and other steel items.

Summed up, our reserve figures read like this on January 1 of this year: Crude oil reserves stood at almost 28 billion barrels. Other hydrocarbon liquids boosted this figure to a grand total of 33 billion barrels. Natural gas reserves also continued their steady climb, reaching almost 200 trillion cubic feet. Our gas reserves are now just about equal to our proved oil reserves in energy value.

The National Petroleum Council's 1952 report on Petroleum Productive Capacity shows that since 1948 a sizable reserve productive capacity has been developed. For the future it shows a range of availability with lower and upper limits. The lower limits for the period ending in 1955 show a productive capacity of more than one million barrels a day above the 1952 produc-

* Director and Vice President in charge of Humble's Exploration Department, and Past President, American Association of Petroleum Geologists.

Seismograph crewman attaches a pickup to his cable before a shot is fired. Explosion vibrations are recorded on film, then translated in terms of underground structures.

Seismograph shot sends mud and water spurting high. A small dynamite charge creates an artificial earthquake. Vibrations, recorded on film, give clues to subsurface.

tion of 6.8 million barrels per day of total petroleum liquids. The upper range of availability is indicated at 8.8 million barrels per day, or two million barrels a day over 1952 production. Those of us who worked on the first availability report in 1948 and subsequent reports know that in the past such reports have been conservative. Actual performance seems to track the higher part of the range rather than the lower area.

ESPECIALLY important is the Council's statement of its major findings, as follows:

> "Available supplies of oil and gas in the United States and the world are greater than ever before and are still increasing rapidly. Granted continuation of reasonable economic incentives and adequate supplies of materials, crude oil and natural gas may be counted upon to be available in abundance for the foreseeable future."

There were 700,000 wells completed in the United States in the first 67 years of the oil industry's existence through 1925. Another 700,000 wells were drilled in the next 25 years through 1951. The NPC report furnished an interesting comparison of the results of drilling in those two periods. The first half of all U. S. well completions provided crude reserves of 13.2 billion barrels. The second half of the wells, drilled in 25 years, developed 57.3 billion barrels. In other words, wells drilled in the last 25 years accounted for an average addition of new oil of about 82,000 barrels per well. In the last ten years the average has been 87,000 barrels for each well completed.

At the 1952 rate of drilling, another 700,000 wells will be drilled by the end of 1965. If these wells should develop as much new reserves as wells have averaged in the last ten years, then the new oil added by 1965 would amount to about 61 billion barrels.

The correlation between all wells drilled and new oil added over long periods of time has been noted by several writers. From the exploratory statistics of F. H. Lahee, distinguished compiler of exploration and reserve data, there appears in recent years to be a better correlation between exploratory footage drilled and the amount of new oil found. During the past six years, for example, U. S. exploratory wells have increased from a little more than 5,000 to over 12,000 in 1952. During this period crude reserves increased by over 30% and the number of new fields found each year has doubled.

Also, from Lahee's data, we find that the number of exploratory dry holes drilled for each exploratory producer is less since 1943 than before that date (in 1940 there were over 7 dry holes for each producer). Since 1944 it appears that the curve has remained fairly constant at 4 exploratory dry holes to each producer. Lahee's figures also show us that for the past 8 years about one in nine "new field" or "rank" wildcats have been productive.

Lahee's statistics were studied to see if light could be shed on the question of decreasing size of fields found. The percentage of new fields representing reserves of 10 million barrels or better was found to have declined from about 20% in 1938 to less than 10% in 1941. From 1941 to 1947 the percentage has appeared to be fairly constant at about 7½% with new fields found around 300 per year. (20-25 large fields per year.) For the past 3 or 4 years the percentage has seemed to drop again, but the number of new fields found annually has been observed to rise sharply. Thus the two curves are to a large extent compensating, and total number of large reserves found each year appear to compare reasonably well with the number found some years back, although on a percentage basis the comparison is not as favorable. It should be remembered, however, that it often requires 5 years or more to estimate the size of a field accurately, and some fields not now so regarded may in the future be reclassified into the larger class.

WHEN it is considered that estimates of crude oil proved reserves have multiplied about six times since World War I and doubled since the beginning of World War II, and when it is further considered that this growth in crude reserves has occurred during a period when crude oil withdrawals have increased over 500% since World War I, it appears that the finding forces of the industry have done an outstanding job in keeping ahead of production rates which were undreamed of even at the beginning of World War II. During the last 14 years, our oil finders have found 1½ barrels for each barrel produced. It seems important to attempt to analyze this progress and to determine what the principal factors are which have contributed to it.

Radar operator signals for marker to be dropped for seismograph shot at sea.

Balloons go over side of boat, marking seismograph shot point every 1200 feet.

In Drake's time, of course, and for many years thereafter, there was no such thing as scientific exploration for oil. The search was largely a hit or miss sort of thing. Old-timers grasped at any clue which experience or fancy seemed to indicate might be of aid. This resulted in a mixture of so-called "finding techniques," some of which were valid, but many others were pure quackery. Oil seeps, gas bubbles, peach tree switches, a circling bird, or the unexpected breakdown of a wagon—all of these and many others were sometimes looked upon as good omens.

IT WAS not until 1913 that geology was seriously applied to the search for oil and then only in selected places. Only in the past 10 to 15 years have many of the most important geologic concepts bearing on the origin and accumulation of oil become real factors in the work of the exploration forces of the industry. Now basin studies, detailed thickness maps and regional structural studies have become the rule in all well organized exploration groups, large and small. Surface geology instead of disappearing from the field as some thought it might a dozen years ago, has made a comeback with the result that it is believed there are more field crews doing surface mapping today in the U. S. than was the case in the twenties. Furthermore, they are doing a much more efficient job with the aid of aerial photographs.

Today relatively little exploratory drilling is done without technical advice. Only a few years ago it was common practice for individual operators, small companies, and even large ones, to assemble a block of acreage where someone thought it was a likely spot and to drill a well on it. Now the independent producer is employing the best exploration counsel he can find and his batting average, which was pretty good even in the old days of hit-or-miss, now sometimes causes company men to scratch their heads. This enlightened exploration policy on the part of smaller organizations has become a real factor in our industry finding success.

Surface geologist studies outcropping rock for hints of what may lie below.

One of the reasons why present-day geologists and geophysicists can cope more successfully with the increasing complexities of exploration is that they are better trained due to more comprehensive college curricula now available to them. Our schools have improved! However, one of the causes of real concern for the future is whether or not we will continue to receive an adequate supply of properly trained young petroleum geologists, because the number of young geologists coming into the profession appears to be lessening rather than growing.

There have been no radical or sensational discoveries in new finding methods. We still rely on the seismograph, gravity meter, and the magnetometer as our principal geophysical instruments, although we have provided some of them with wings. We supplement the information provided by them with data from surface work, core drilling, and from subsurface interpretation. We have, however, learned to coordinate the results of all of the different finding methods, and this is probably more important in most finding organizations than would have been the discovery of some new finding tool.

The significance of the high degree of cooperation between the geophysical and geological groups in many modern exploration organizations cannot be over-emphasized. Between the two groups, a new spirit of teamwork now exists which has largely replaced an older attitude of indifference, and sometimes even of antagonism. With the team spirit there has also come a feeling of mutual respect and appreciation of each others' work. Where this happy state has been achieved, a striking increase in finding efficiency is usually realized.

NOW and in the future, as was the case in the past, one of the most important reasons why exploratory efforts of the oil industry in Canada and the U. S. have been and will be successful is due to what Levorsen calls the "multiple effort" system; i.e., that system which "permits the greatest number of holes with the widest freedom for diverse scientific, technical, and personal reasoning." I agree with him that "if there is any oil or gas to be found, it will be found under such a system."

Our problem will take on a better perspective if we realize that the frontiers of oil exploration in the U. S. are still far-flung. The sedimentary area considered favorable for oil occurrence covers about 80% of the country. A symposium conducted by the American Association of Petroleum Geologists in 1951 revealed that 1.6 million square miles or about a billion acres must be counted as prospective area.

In commenting further on improvements which have played their part in providing more reserves, the various logging devices, better methods of drill-stem testing, more accurate core analyses, and more exact completion methods must be recognized for their contributions to the progress and success of oil finding. Many of these aids can be summed up under the general

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In commenting further on improvements which have played their part in providing more reserves, the various logging devices, better methods of drill-stem testing, more accurate core analyses, and more exact completion methods must be recognized for their contributions to the progress and success of oil finding. Many of these aids can be summed up under the general

Gravity meter exploration crew at work in the Southwest. This instrument measures differences in gravity pull, helps locate structures favorable to oil accumulation.

term of improved technology. Actually, the Spraberry trend of West Texas is an excellent case in point. Had it not been possible to complete Spraberry wells properly and stimulate them by the use of sand-impregnated gels and other methods, the trend might still be regarded as entirely non-commercial. The oil industry is already making progress in lowering drilling and completion costs in the Spraberry, and this, together with wider spacing, may yet cause the vast Spraberry trend to become a reasonably good money-maker.

Density of spacing is becoming recognized as being as important a factor in the economics of most producing areas as sand thickness, porosity, and permeability.

It is also believed that there will be increasing recognition on the part of our conservation agencies that favorable economics and true conservation of our petroleum resources are closely dependent, one upon the other.

PERHAPS those who have in recent times reiterated that oil is becoming "harder to find" have used the wrong phrase in describing the difficulties of the present day search. Actually, as some of the statistics mentioned here would indicate, given the proper forces, tools, facilities, and services, and the means to finance them, our proficiency in finding and developing oil has increased. We have taken in stride many factors that might have made oil harder to find. In some respects; e.g., number of fields found each year, it even seems easier! There is one very important difference, however. On any basis which has been examined in this study, oil is more costly to find than was the case at any time in the recent or even distant past. This is true even if costs are expressed in pre-inflation dollars. Furthermore, finding costs still seem to be rising sharply.

Though by no means the whole story, one of the more easily explained causes of rising costs in many areas, particularly some of the older producing areas, is the great depth of wells. In many fields deeper drilling has opened up prolific new reserves, and the fact that operators were willing to carry wildcats to great depths has resulted in a number of important discoveries. It will be of interest to note that until 1930 no well had been carried below 10,000 feet, and that within the past five years the level of deepest production has been dropped approximately 2000 feet.

A recent article in one of the trade journals indicates cost of exploratory wells to be nearly $100,000 as a U. S. average. The same paper shows exploration costs on a per-barrel basis have increased from less than 10 cents in 1936 to more than 50 cents in 1951. It is believed that the increases shown are of the right order of magnitude.

And so we see that the industry is finding a lot of oil: enough to more than keep pace with production; enough to build up reserves satisfactorily in the face of large withdrawals; but it is costing more than five times as much as it did 15 or 20 years ago to find it. Nevertheless, oil finding has become more efficient. This has been necessary in order to offset even partially the sharply rising costs and in order to measure up to the needs of the industry and the western world. A partial answer to how successful this effort has been is the fact that the retail price of gasoline is the same today as it was in 1925, excluding taxes.

Last year I had the opporunity of hearing Eugene Holman's address in Los Angeles on the subject of "Our Inexhaustible Resources." The similes he used in describing the exploration process are so apt that I believe they will bear repeating. He said:

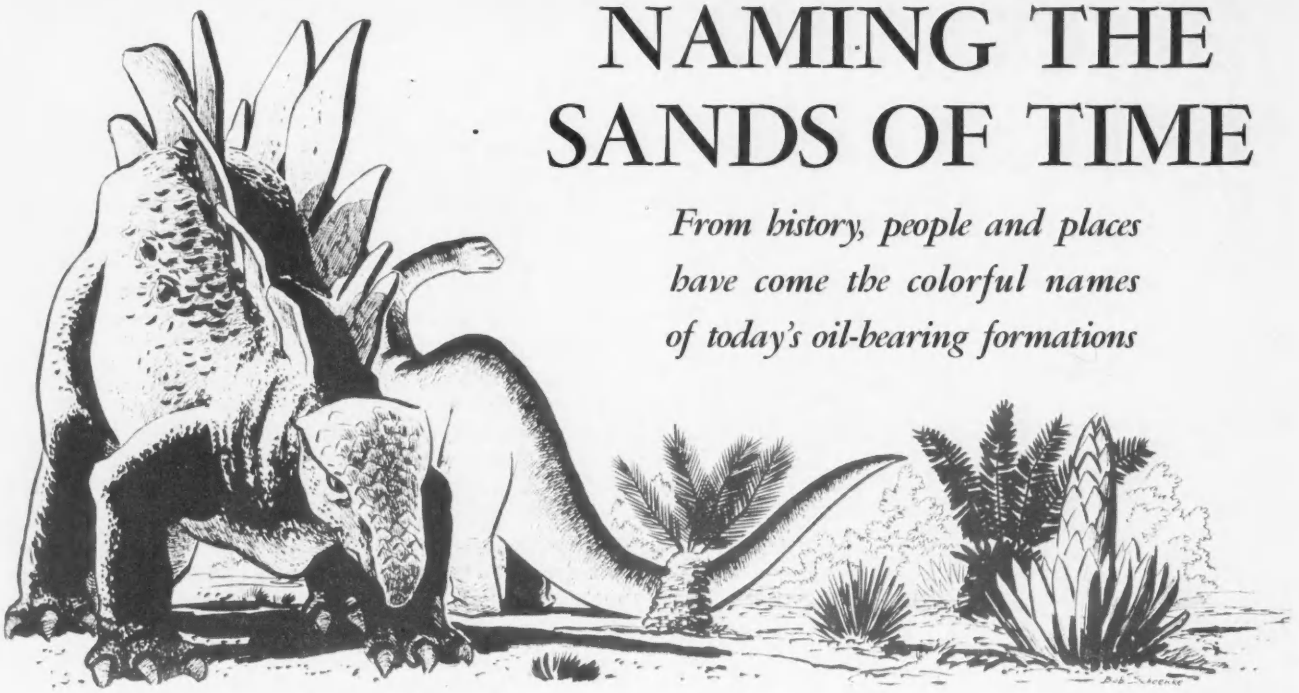
> "For many years, I believe, people have tended to think of natural resources as so many stacks of raw material piled up in a storehouse. A person with this sort of picture in his mind logically assumes that the more you use of any natural resource, the sooner you get to the bottom of the pile. Now I think we are beginning to discover that the idea of a storehouse—or, at least, a single-room storehouse—does not correspond with reality. Instead, the fact seems to be that the first storehouse in which man found himself was only one of a series. As he used up what was piled in that first room, he found he could fashion a key to open a door into a much larger room. And as he used the contents of this larger room, he discovered there was another room beyond, larger still. The room in which we stand at the middle of the 20th century is so vast that its walls are beyond sight. Yet it is probably still quite near the beginning of the whole series of storehouses."

I am confident that our exploration forces in the industry will for a long time continue to find a way to fashion a key that will unlock the next larger of nature's storehouses.

Continued success in oil and gas exploration in this country will in the main depend upon the development of even greater technical skills, a willingness to take large calculated risks, and the development of even greater cooperation between those contributing toward the exploration process. But this success will also depend upon the maintenance of an optimistic outlook within all branches of an industry which must continue to support and encourage those who are charged with the responsibility of finding our future oil and gas reserves.

NAMING THE SANDS OF TIME

From history, people and places have come the colorful names of today's oil-bearing formations



DURING the westward migration of settlers the Comanche Indians probably put up as much resistance as any tribe. Fierceness and bravery in battle were the marks of members of this tribe, even to their last days here in Texas.

Perhaps they would have been even more determined to hold back the white man had they known that under land on which they hunted there lay formations containing oil in great quantities. For it is in a group of Cretaceous formations, known to geologists as the Comanche series, that some of the nation's substantial oil fields have been found. The series was named from the town of Comanche in Comanche County, where excellent type outcrops are exposed. The name Comanche was originally taken from the famous Indian tribe that once roamed through Texas and adjoining areas.

In like manner, many other famous producing sands and formations—Tuscaloosa, Wilcox, Frio, Cockfield, Edwards, Woodbine, Ellenburger—have received their names in sometimes unusual ways.

Many formations are named for towns, counties, rivers, mountains, or other prominent features near which they occur and were first well defined by geologists. The geographic names, in turn, come from early settlers' names, or from descriptive appellations. A number of names are of Indian or Spanish origin, particularly in the South and Southwest.

A formation usually gets its name when a geologist, or someone else concerned with its nature, describes it and uses his term in published matter or in some other form of work. If the name "sticks," it will soon become common usage in geological circles, and will occur in bulletins such as those put out by the United States Geological Survey.

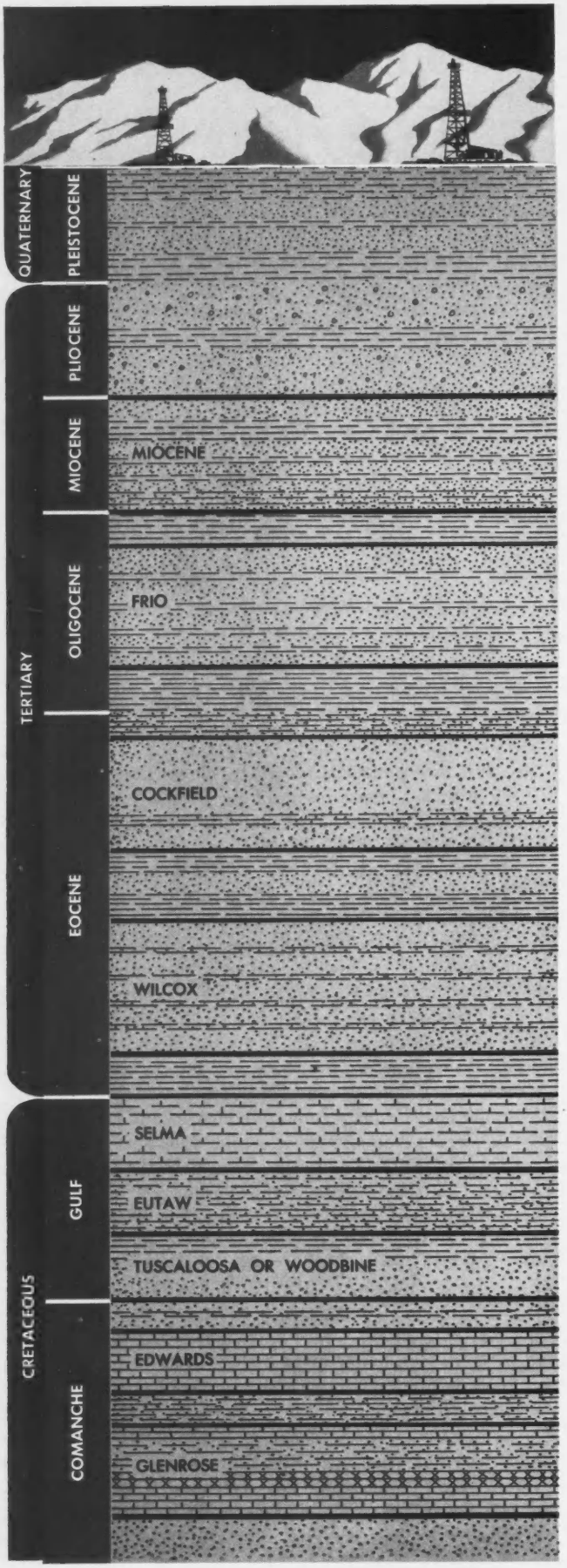
There are often conflicting interpretations of what is to be accepted, however, and arguments lasting for years have been waged over whether or not a certain formation is of the same age as another, miles away and previously named. Even a typographical error can lead to confusion, as in the case of a formation called "Cherry limestone," originally described in a geological report as "cherty limestone."

For a basic understanding of the science of the earth, it is necessary to know that our planet is estimated by scientists to be a staggering 2,000,000,000 years old, at least. Nearly three quarters of that time had elapsed before the Cambrian period began, the first from which adequate records of life have been found. The word "Cambria" is the Roman name for Wales, where rocks of the period were first studied.

Geologic time is classified into great eras, often divided by periods of profound mountain-building known as revolutions. The earliest era is the Crytozoic, sometimes called the pre-Cambrian because little is known of the life. Next in order of their age are the Paleozoic, the Mesozoic, and the Cenozoic eras. The Cenozoic, being the latest, takes its name from the Greek word "kainos," which means "recent."

Each era has subdivisions of time known as periods and epochs, some with jaw-breaking names. In the Paleozoic era are the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian periods. The Triassic, Jurassic, and Cretaceous periods belong to the Mesozoic era; and the Tertiary and Quaternary make up the Cenozoic era. Subdivisions of the Cenozoic periods are the Eocene, Oligocene, Miocene, Pliocene, Pleistocene, and Recent epochs. Periods and epochs are recognized by differences in the fossil content of the sediments.

Every rock unit, naturally, falls within a certain geologic time period. By studying the fossils found in beds of a series or formation, and in rocks over and underlying them, geologists determine the era and period to which these rock units belong. Once a rock unit has been defined and named, it usually retains its name, even when it is mapped in other geographic localities.



The Cincinnatian series, for instance, was named after rocks exposed in the region of Cincinnati, Ohio, although equivalent strata in New York and elsewhere belong to the series and are also called Cincinnatian. Often, however, formations which are alike in period and type but occur in different areas are given different local names which come into common use.

The animal and vegetable remains of some periods, in combination with the type of sand or rock into which they settled, make certain strata much more favorable for oil production than others. Formations of Ordovician, Permian, Cretaceous, Oligocene, and Miocene age are some that are especially productive in Humble's operating area.

The Company's Sunniland Field in Florida produces from Glen Rose limestone. The Glen Rose, named for rock outcrops at and near the county seat of Somervell County, Texas, is part of the profitable Comanche series.

In Alabama, the formations most important for oil production at present are the Tuscaloosa, Eutaw, and Selma. All three are named for towns in Alabama. The word "Tuscaloosa," like many another in North America, goes back to an Indian tongue, "Tuska" meant "warrior" in the Choctaw language, and "lusa" meant "black." Chief Tuskalusa was a gigantic Choctaw chieftain who was defeated by Hernando de Soto in 1540.

Mississippi fields also produce from the Tuscaloosa, Eutaw, and Selma formations, but another important group is the Wilcox. The group includes sands, clays, lignites, and marls, and is named for Wilcox County, Alabama, where it is extensively developed.

Sands of Miocene age are the most important in Humble's production operations in Louisiana today. Offshore and southern areas of the state produce from its many sands, which are often named after fossils and then numbered. In the Duck Lake Field, for example, a series of sands lies within the *Uvigerina lirettensis* zone; another is the *Bigenerina floridana* series. For convenience, geologists refer to them as "UL" No. 3, No. 4, or "BF" No. 4, No. 5, and so on. Sometimes alphabetical classifications subdivide even the numbers.

Another important formation in Louisiana is the Cockfield, the sands of which are frequently found oil-productive in the central part of the state. Cockfield Ferry on the Red River, near Petite Ecore in Louisiana, is responsible for its name.

Highly valuable in Louisiana, but even more so on the Texas Gulf Coast, is the famous Frio formation. The Louisiana fields which produce from it are located principally in a band between the Cockfield and the Miocene trends. In Texas, a substantial amount of Humble's production comes from the Frio in a number of great fields—Anahuac, Friendswood, Hastings, Sugarland, Thompsons, Tom O'Connor, Stratton, Seeligson, and Borregos. The name "Frio," which means "cold" in Spanish, comes from the Frio River in Texas.

Farther toward the center of the state, Edwards limestone is the formation from which several fields produce. The limestone was named for the Edwards Plateau, which in

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Not an actual cross-section of any area, this drawing shows some formations along the Gulf Coast from Texas to Florida.

turn was named for Haden H. Edwards, an early Texan who fought in the state's battle for independence and served as a representative to the First Congress of the Republic. The Luling, Darst Creek, Salt Flat, Imogene, and Charlotte fields produce from the Edwards.

In East Texas, Woodbine sand is the most famous formation, responsible for production in the tremendous East Texas and Hawkins fields. Outcrops at the small town of Woodbine, in Cooke County, Texas, are the basis for its name. Woodbine sand is equivalent in part to the Tuscaloosa of Alabama.

Three groups of sands and limestone—Canyon, Cisco, and Strawn—are the key to much of the production in North Texas, one of the oldest oil-producing areas of the state. All three are named after Texas towns.

Subdivisions of these three are among the most colorfully named strata in the state. Thrifty, a member of the Cisco series, was named for a village in Brown County, Texas. When the town was founded in 1868, it was named for the industrious spirit and frugality of the settlers. Gunsight, another Cisco stratum, received its name from a town in Stephens County, which in turn was named for the nearby Gunsight Mountains. The mountains looked to early Texans "as straight as a gun barrel, with a projecting peak representing the gunsight," according to history books. Still another Cisco member, Nimrod, was called after a town in Eastland County where a Biblical character was inspiration for the name.

The Canyon series includes among others the Ranger and Wizard Wells sands, both named after Texas communities. The town of Ranger was so titled because it was built up around a Texas Ranger camp, and Wizard Wells because flowing mineral wells close by were supposed by the occupying Kiowa Indians to have medicinal value.

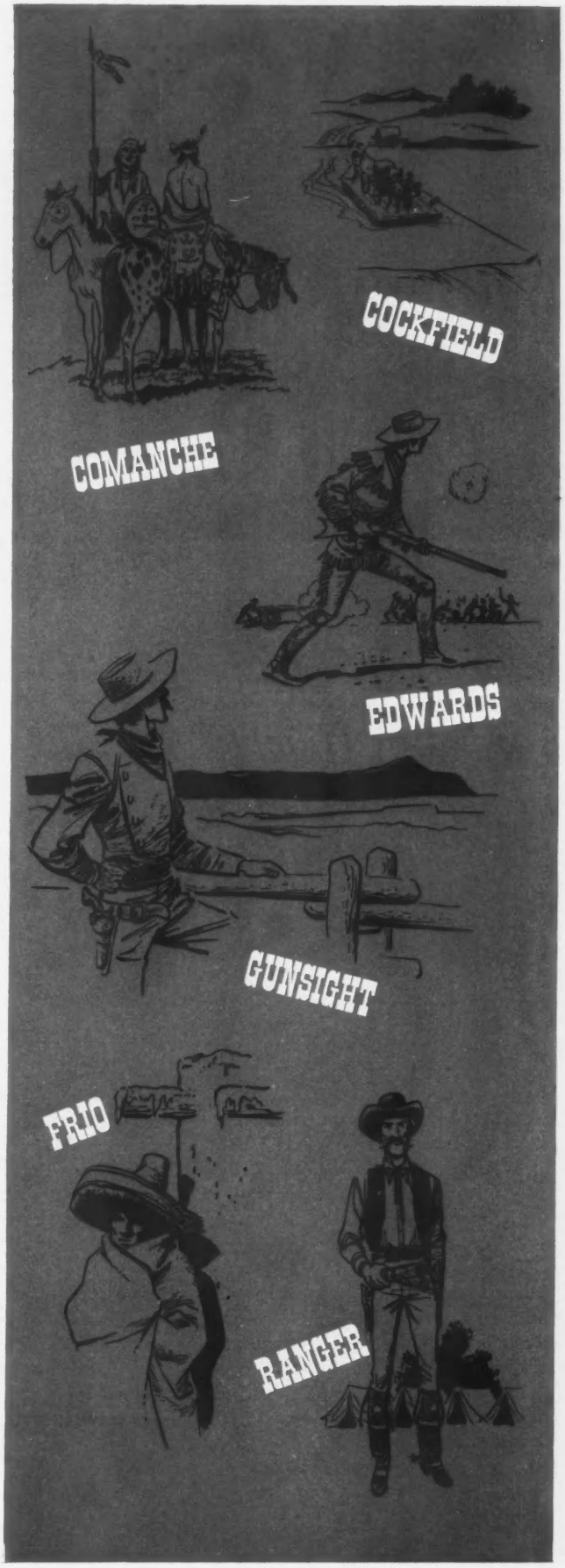
In West Texas and southeastern New Mexico, sands and limestones of Permian age account for production in most of the major fields. The Yates Field produces from a sand also named Yates after the man on whose land the field was found. The Wasson and Slaughter fields are from San Andres limestone, named for the San Andres Mountains. The mountains' name is Spanish for "Saint Andrew."

A formation called Seven Rivers, the name of which originated in New Mexico, is responsible for production in the Hendricks Field. Ellenburger limestone, named for the Ellenburger Hills in Burnet County, Texas, is the producing zone in the Big Lake and Yarbrough & Allen fields.

Rocks of the Devonian period, part of the Paleozoic era, are also becoming important in New Mexico and West Texas. The Devonian period was named after the province of Devonshire in England, where formations of that time were studied more than a century ago.

Eocene and Miocene formations have proved most valuable in Humble's production thus far in California. The Rosedale and Castaic Junction fields produce from upper Miocene sands. Oil reservoirs at Castaic Junction have been numbered, instead of named, by Company geologists.

Once a formation's name has become well known, it means a great deal to the people in an area, and their ears grow attuned to the mention of famous producing sands. To outsiders, though, it still sounds as if the men behind the scholarly tomes and technical reports have a strange sense of humor.



DERRICKMAN'S SKY HOOK

Elevator gadget devised by Humble employee simplifies derrick-climbing

Scampering aloft at end of counter-weighted cable, the derrickman expends little energy. Use of elevator gadget saves time, makes derrick-climbing safer, easier.

A SIMPLE one-man derrick elevator, resulting from a Coin-Your-Ideas suggestion by a Humble drilling crew member, is making the work of derrickmen easier, safer, and a lot more pleasant.

The gadget provides a counterbalance which offsets most of the derrickman's weight and enables him to climb up and down the towering derrick with amazingly little effort.

Invented by Louis F. Postert, derrickman on Humble Rig No. 14, the elevator meets a need felt by every man who has ever "worked derricks" since rotary drilling rigs first came into use more than half a century ago.

During drilling operations, much of the derrickman's working time is spent on the "monkey board," a narrow platform perched high above the drilling floor. To get there, he must climb the tall vertical ladder that runs up the side of the derrick.

This ladder-climbing chore was not much of a problem in the early days of wooden derricks and short sections of drill pipe. But, as derricks grew taller and the monkey board moved higher, the derrickman's climbing duties became more time-consuming.

Today, a standard drilling derrick may extend 136 feet into the air—about the height of a 12-story building. And monkey boards are now located some 90 feet above the derrick floor.

When the crew makes a "round trip" to change drilling bits, the derrickman may have to go up and down the ladder to the monkey board several times in one day's tour. On occasion, he must climb all the way to the top of the derrick.

Unassisted, that kind of climbing can become tiresome work. Sometimes the derrickman finds it necessary to stop somewhere on the way up and rest for a moment. When he reaches the monkey board, he must pause again and catch his breath before he is ready to work. If a strong wind is blowing, or if there is ice or dew on the ladder rungs, the long climb up the ladder becomes even more difficult.

The simple elevator designed by Derrickman Postert eliminates the fatigue and most of the hazards of derrick climbing. The gadget has a long cable that runs through a sheave, or pulley, attached to the derrick at the head of the ladder. At one end of the cable is a double safety belt; on the other end is a weight made from a segment of steel casing. This counter-weight, suspended on two pulley wheels, glides up and down the top guy wire of the derrick.

To use the elevator, the derrickman merely secures the double safety belts about his body, then climbs the ladder in the usual manner. As he climbs upward, the weight on the other end of the cable glides down the guy wire, counter-balancing most of the man's weight. The higher he climbs, the lighter he becomes, because the weight of the cable as it passes through the overhead pulley is added to the counter-weight side.

Thus, a 200-pound man using this ingenious gadget, would have an apparent weight of only about 90 pounds at the bottom of the ladder. His weight would decrease gradually to about 50 pounds when he climbs to the top of the derrick.

Despite its extreme simplicity, this elevator has many points in its favor. It enables the derrickman to go up the ladder with much less effort and with much greater safety. It speeds up the rate of ascent and eliminates the need for rest stops. Since the derrickman can now climb to the monkey board without fatigue, he can do his work there with more efficiency and greater safety.

Derrickman Postert got the idea for his invention from observing the ease with which members of the drilling crew picked up the counter-balanced heavy tongs used on the drilling platform. He submitted his design to the Company's Coin-Your-Ideas committee, and has received two cash awards totaling $245. His invention, in slightly modified form, is now being used on 17 Humble drilling rigs, and will soon be in operation on several others.

Drilling crews, and especially derrickmen, are enthusiastic about the elevator. Their attitude is reflected in the comment of one sage driller with many years of oil field experience.

"If I'd had one of those contraptions when I was working derrick," he said, "I'd be ten years younger now."

Before starting his climb, the derrickman snaps double safety belts into place. Demonstrating in photo is Louis F. Postert who designed the derrick elevator.

Counter-weight seen in foreground below is piece of steel casing suspended on pulleys from derrick guy wire. As man ascends ladder, weight slides down wire.

Executives of MECO—Metal Engineering Company, the Humble-sponsored Junior Achievement group—check upon sales and profits from the metal utility cart they manufacture. Left to right are Earl Hughes, production manager; Donald Telschow, president; T. P. Craddock of the Humble Company, MECO's chief advisor; Sally Craig, vice president; and Peggy Fitzgerald, sales manager. In the background other MECO members work on the production line, and a newly-finished utility cart may be seen on a table at center.

Utility carts manufactured by MECO are displayed by Joan Day, Peggy Fitzgerald, and Joe Spivey of Humble's Sales Department, who is sales advisor to the junior company. Other members of the Humble advisory group, who are not shown here, are M. E. True, H. M. Lemex, and R. C. Buchan. These men have "invested" about 1000 hours in MECO, assisting the young business people. The advisors work with Humble Director C. E. Reistle, Jr., assisted by J. V. Blacklock, Production Department.

$uccess at $eventeen

FOUR hundred Houston stockholders and corporation executives, aged 15 to 21, were guests of honor recently at a "Future Unlimited" banquet held to pay tribute to their business success.

No, these were not wealthy child prodigies, but average high school students, celebrating National Junior Achievement Week and their part in our nation's fastest-growing youth movement. Each one is a stockholder, officer, producer, and salesman in his own junior corporation.

Junior Achievement is a national organization which offers boys and girls a chance to learn the American system first hand—our concept of private ownership, free enterprise, freedom of opportunity, and the responsibilities which go with our freedoms.

Junior Achievement is now operating in 92 cities. In Houston alone there are 40 junior companies. The organization offers tools and a place to meet, volunteer sponsors give assistance and advice, but the young men and women themselves provide the ideas, initiative, and work to make the companies go.

Humble has sponsored a Junior Achievement company since 1946, and the present Humble-sponsored group—MECO, or Metal Engineering Company—is a typical example of how these companies operate.

The 18 students from five high schools in MECO first met at the beginning of the school year and decided to form a metal goods company. They selected a product—a metal utility cart for easy handling of garbage cans and the like—and with the aid of five advisors from the Humble Company planned their manufacturing and sales operations.

To raise capital the young entrepreneurs sold 200 shares of stock in the company at 50 cents each. With this money tools were leased, raw materials purchased, and manufacturing operations were started.

When the utility carts began coming off the "production line," a sales and advertising program was begun. Each member became a salesman, just as each participated in all other company operations. Although MECO meets only one night a week, the young business force has made and sold about 400 carts at $3.00 each!

While profiting through experience, the group is also profiting financially. They pay themselves 15 cents an hour for labor and a 25 cent commission on each sale. But their proudest achievement is the $400.00 net profit they show on the books, from which they will pay a good dividend to stockholders and a bonus to themselves.

MECO will be dissolved at the end of this school term, but another Humble-sponsored company will take its place in September, to continue training young people for "futures unlimited."

TEAMWORK MAKES A DRILLING CREW

There is a Tinker-to-Evers-to-Chance quality about work on a drilling rig

BASEBALL fans thrill to the beauty and excitement of the double play. Everyone recognizes the teamwork it takes to make one. Each player has to be where he is supposed to be and do what he is supposed to do, to make it come off well. A man out of position, a poor throw, or a muffed ball can spoil the play.

Drilling an oil well takes teamwork, too—perhaps even more teamwork than baseball. On the diamond, some plays can be made unassisted. Few, if any, can be made that way on a drilling rig.

If there's one thing in drilling an oil well that calls for double-play finesse and timing, it's the *round trip*. In a round trip, the drilling crew pulls pipe out of the hole, stand by stand, racks the 90-foot stands of pipe inside the derrick, screws on a sharp new bit, then thrusts all the pipe back into the hole, so drilling can be resumed.

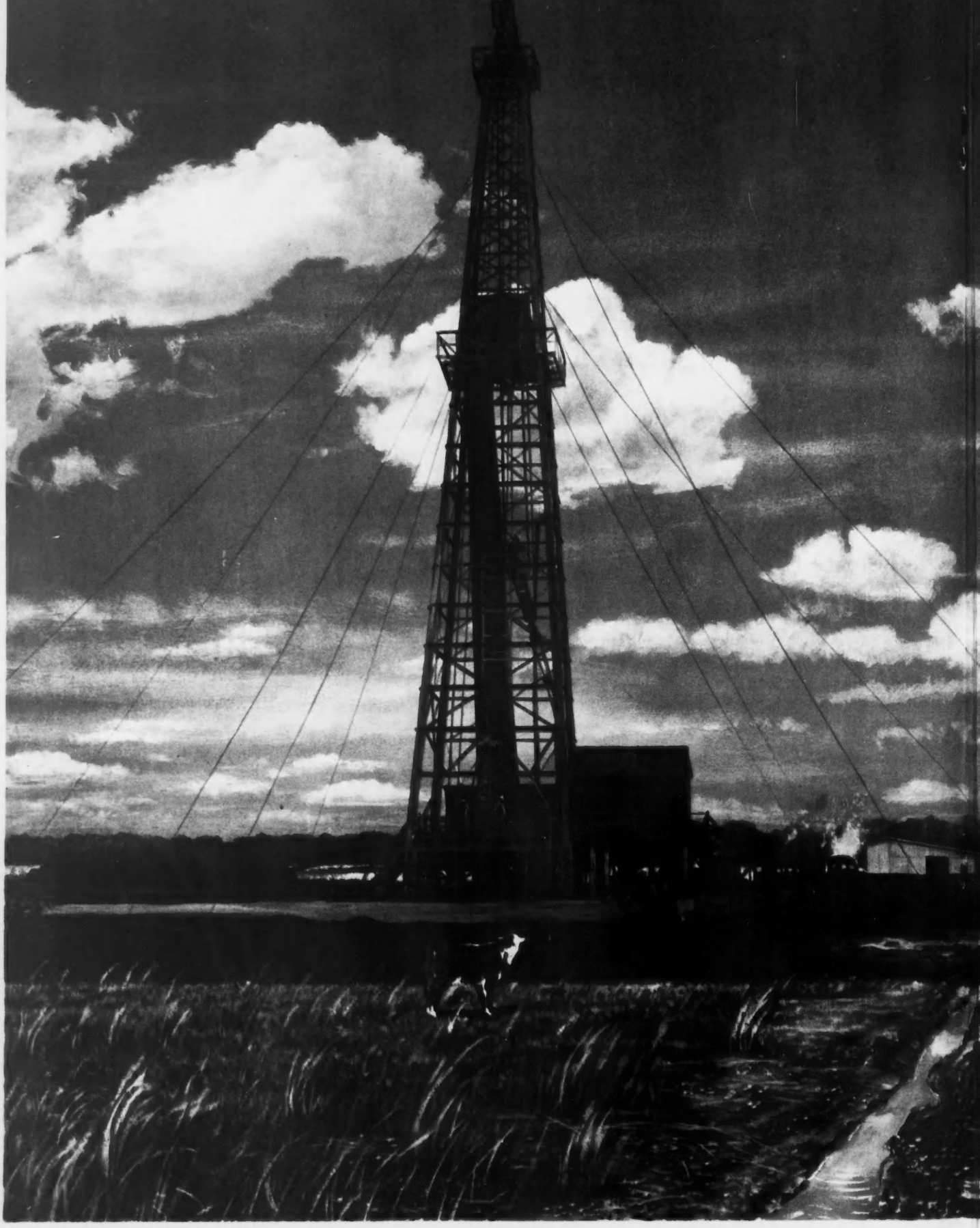
All the skill and teamwork a crew can muster comes into play during a round trip. But first, preparations must be made—just as for any trip. There is drilling mud to be conditioned properly, so it won't flow back up the hole after pipe is withdrawn. There are tools of the trade—the tongs, slips, and elevators—to be lubricated and checked. There is the kelly to be detached from the drill stem and placed in the rathole, a sort of scabbard prepared for it to one side of the derrick floor.

With all in readiness, members of the drilling team take their positions on the "playing field"—the derrickman on his *monkey board* (a working platform some 80 to 90 feet above the derrick floor), the driller at his controls, and the rotary helpers, or floor men, at the *rotary table* in the center of the derrick floor. The fireman or engine man, whose normal duties are to provide power for the drawworks, joins the rotary helpers. During a round trip, as an adjunct to his regular job, he may back up some of the plays on the rig floor.

When the work begins, everything seems to happen at once. The driller, captain of this team, gives his signals as quietly and smoothly as Casey Stengel calls for a stolen base—for everyone on his team knows by long experience what to do.

First, the floor men latch the elevators around the top of the pipe as it juts above the rotary table. A deft touch of his lever, and the driller puts the power of his ponderous drawworks into action, hoisting the entire drilling string of pipe, weighing thousands of pounds, upward toward the derrickman's perch. At just the proper time, the driller cuts his power and applies the brake, stopping the pipe. The top of the first stand of pipe is slightly above the monkey board; it will be un-

Teamwork of round trip is clearly shown in this reproduction of the front cover.



Drilling Crew's Domain

Bob Wygant

The driller at his controls.

screwed at a connection which has just emerged above the rotary table on the derrick floor.

No sooner has the driller set his rotary slips below this connection (to hold the drilling string suspended in the hole) than floor men engage tongs to break and unscrew the connection. With all members of the crew taking part, it is an operation that requires only a few seconds to complete.

The fireman at his boilers.

One rotary helper, or floor man, pulls the lower end of the unscrewed stand laterally to racking position at one side of the derrick floor. His companion remains at his post, lubricating with a bit of grease the threaded end of the stand next to be pulled.

Meanwhile, atop the monkey board, the derrickman throws a length of rope around the upper end of the pipe and jockeys it toward him while the driller lowers the base of the stand gently to the derrick floor. With a skillful stroke, the derrickman unlatches the elevators and places the upper end of the pipe in secure position inside a finger-like rack near the monkey board. With power and skill born of long practice, the heavy pipe has been handled and stacked as neatly as standing a Louisville Slugger in a bat-rack.

As the elevators swing free from the derrickman, the driller lowers them to the derrick floor, where rotary helpers latch them to the next stand of pipe. And so on and on the work goes—latching, hoisting, unscrewing, racking—until the last stand of pipe comes up and the bit is changed. It is work which goes on continuously, with a smooth and efficient rhythm. It may take only a few times, if the hole is still shallow, or it may take up to 200 times on deep wells.

With all pipe withdrawn and a new bit in place, there is little time to relax between games. As a sort of doubleheader, the whole thing must be done all over again—but this time in reverse, to put pipe back in the hole and start drilling again.

The work of a round trip is as fundamental to drilling an oil well as hitting and fielding are to baseball. Round trips have to be done time and time again on every rig. Learning to handle them rapidly and smoothly, with work going on simultaneously by all crew members, means that each man must know what his assignment is and carry it out properly. At almost every juncture, the success of one man's work depends on the work of his teammates.

Other jobs on a drilling rig take teamwork, too; the round trip is just an example. There are the jobs of laying down pipe after the well is drilled; cutting open sacks of cement when there is a plug to be placed; running casing; carrying on blowout drills, so each will know what to do if danger threatens; and many others.

No wonder members of a drilling crew pride themselves on their ability to work as a team! To them, teamwork means much more than winning or losing a game, though there is naturally pride in working on an outstanding crew. But here, an even higher stake rests on teamwork. Without it, drilling costs can mount, the well can be lost, and even life itself might be endangered.

Under conditions like that, where the safety of one man depends on the conduct of all, Humble drilling crews know that teamwork pays its own rewards.

Time out for coffee.

Ships from the fleets of the world load at Houston Ship Channel Turning Basin.

World's Greatest Oil Port

Man-made Ship Channel makes Houston— 50 miles from sea—nation's 2nd port

THE blast of a whistle startled clouds of birds from the Texas coastal prairies on a January day in 1837 as a steam ship seemed to invade dry territory, far inland from the sea.

Indeed it was a ship, even though a very small one, churning across the flats through a little bayou which knew the thrust of the oar but not of the paddle wheel. She was the steamer *Laura,* exploring dangerously shallow inland waterways on one of the earliest known voyages to the City of Houston, then seat of the government of the new Republic of Texas.

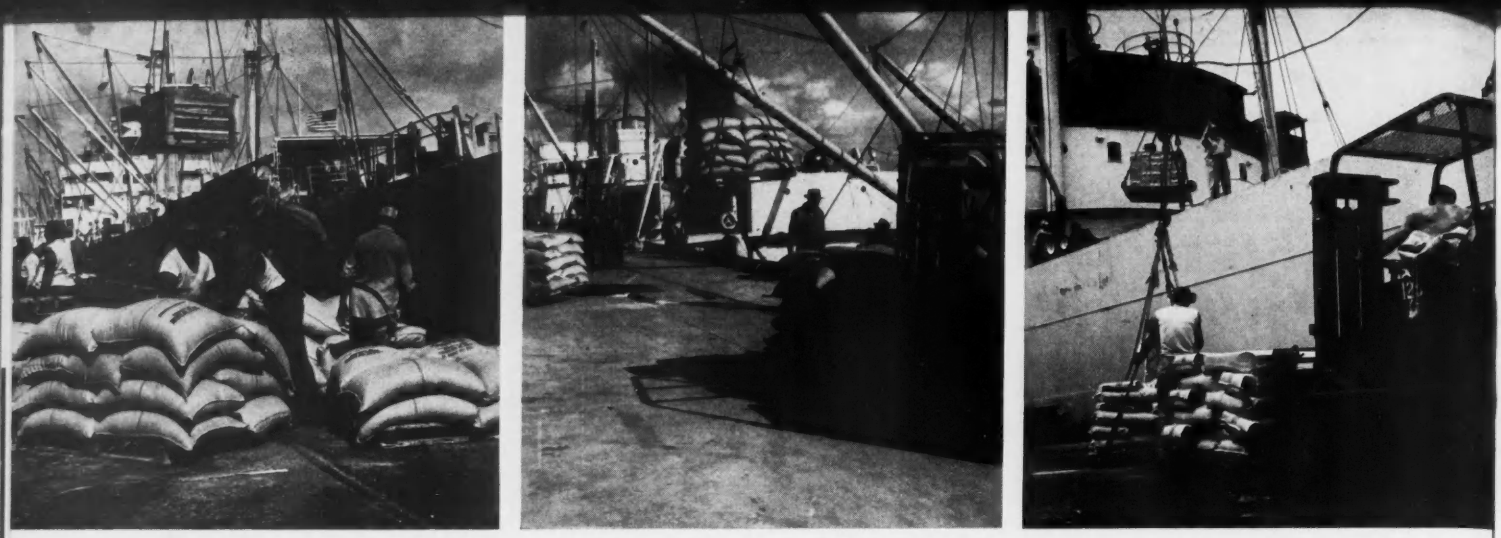
Across Galveston Bay the little steamer had come, up the San Jacinto River, and now she cautiously eased her way through a winding stream called Buffalo Bayou which led to her destination.

A seaman in the bow hurriedly "heaved the lead," sounding the meager depth of water. A few passengers paced the deck, eyeing the narrowing banks and their overhanging cypress trees. The *Laura* crept ahead slowly, more slowly, until finally the overhanging vegetation completely barred her way. Now all hands swung axes and knives, and the vessel hacked and paddled her way onward.

For three weary days the process continued.

Time of arrival came, and passed, and still there was only a muddy ribbon of water ahead. The engines stopped, paused, and then reversed. The *Laura* had steamed directly past the City of Houston, missing the newly laid-out town entirely! Eventually she backed up, located her destination, and landed, unloading passengers and cargo.

Thus the *Laura* became the forerunner of thousands of ten-times larger



A few of the many products which pass through Port Houston are shown here. At left, coffee from Brazil is unloaded as machinery goes aboard. Center, a ship loads rice. At right, bagged synthetic rubber goes on as canned pineapple comes off.

ships carrying millions of tons of cargo, for the sluggish bayou was to become a major commercial waterway—the Houston Ship Channel—and the Port of Houston the nation's second ranking port. In 1952, ships and barges following the old Bayou route hauled a record 45.5 million tons of cargo worth $2 billion!

If the passengers and crew of the *Laura* could repeat their trip today, they would find smooth sailing down a largely man-made channel 36 feet deep which ranges in width from 300 to 400 feet. Their problem today would be in keeping their "Model T" vessel out of the way of traffic, for every hour sees the arrival of one or more ocean-going ships and the passage of countless barges, tugs, and smaller craft. More than seven thousand seagoing vessels steamed through the Ship Channel in 1952—more than passed through the Panama Canal—in addition to some 10 thousand barges.

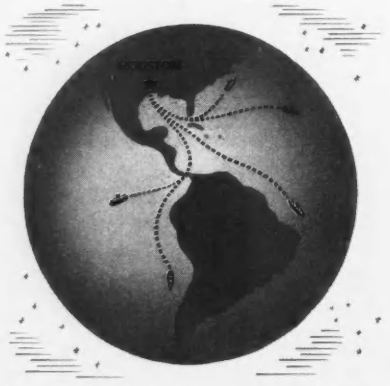
THE eyes of the *Laura's* passengers would pop today as they surveyed the banks of the channel, no longer empty prairie but site of a mighty concentration of industrial power. More than 100 major industrial plants now line the once-sleepy Bayou, sharing the great benefit which it offers—water transportation to the markets of the world.

Even the *Laura's* most disinterested deck hand could not miss the City of Houston today, for the vessel would reach the Ship Channel Turning Basin within clear view of skyscrapers in the South's largest metropolis. The little steamer would find unlimited "parking space" too, for the Port of Houston offers dockage along the channel for 83 ships and up to 25 barges, and 2.5 million square feet of warehouse space.

Everywhere in the Turning Basin, where most of the Port's facilities are located, the *Laura's* crew would hear the grind of undreamed-of machinery, loading or unloading cargo—cotton, wheat, oil well supplies, milo, carbon black, chemicals, machinery, coffee, canned pineapple, sugar, steel and many other products and natural resources from or for points throughout the Southwest and Midwest.

But in particular the *Laura's* voyagers would note the tanker ships and barges loading crude oil and petroleum products, and the shining towers and tanks of oil refineries up and down the channel. The Port of Houston, they would learn, is the largest oil port not only in the nation, but in the world!

Ninety-three oil tanker lines serve the port, and last year 1885 ocean-going tankers and numberless barges hauled more than 32 million tons of crude oil and refined products through the channel—roughly 70 per cent of the entire tonnage handled by the port.



Tankers and freighters from Houston haul payload to ports over the world.

How did a sluggish bayou and a little town 50 miles from the sea become such an important port of the world? It is a story of Texas enterprise, of obstacles met head-on and conquered, and of the birth and growth of the Texas oil industry.

THE opening chapter in Port Houston's story was written in the late 1700's by French and Spanish traders, the traveling salesmen of their day, who paddled their pirogues into Buffalo Bayou and the San Jacinto River to swap their goods.

Other boats paddled the stream as settlers gradually moved into the area, and in April, 1836, General Sam Houston led his revolutionary army across the Bayou to meet the forces of Mexico and win freedom for Texas in the Battle of San Jacinto.

Early in the same year John K. and A. C. Allen founded the City of Houston on the banks of the Bayou. They located there "on purpose," for the Allens and other ambitious settlers were fired by a dream—a vision of a great port located 50 miles from the sea—and they sold land in the new town on the potentialities of the waterway.

A short time after the *Laura* made her almost-unnoticed voyage to Houston, the Allens—real estate promoters whose talents make present-day developers envious—devised a "publicity stunt" to notify the world that here was a new port.

They arranged to have the famous

old warship *Constitution*—"Old Ironsides"—make a "test" trip up the Bayou to prove, once and for all, that it could be done. The big sailing ship docked safely at the city landing, but consternation swept the festive occasion when the vessel tried to begin the return trip. There was not enough room in the Bayou to turn around! A hurried survey developed, a wide bend was located, and here the ship was able to swing around and begin her return voyage. The place was immediately named Constitution Bend, and today it is the Ship Channel Turning Basin, 1100 feet in diameter, where even the largest vessel can turn around.

After the arrival of the *Constitution,* other vessels began venturing into Port Houston, and in 1839 the first five miles of the Ship Channel were completed. Citizens pressed for more improvements, but it was after the Civil War before any real progress was made.

Snags and sharp turns made navigation of the channel hazardous, and ships often smashed together trying to pass within the narrow banks. There were disagreements and disappointments for supporters of the port, and there were quitters. One called the channel "the d---est fake out of doors!"

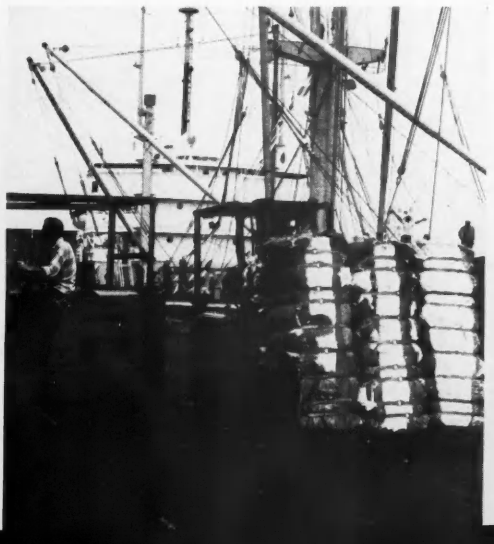
Into the hold of a ship go Humble petroleum products in barrels, bound for South America. Most petroleum is loaded in "bulk" aboard regular oil tankers and barges.

STILL the vision of the Port of Houston lived on, and the doubters were outnumbered. In 1873 Commodore Charles Morgan, two-fisted founder of the Morgan Line, organized private interests to finally complete the channel from Galveston Bay to a point below Houston. This he did, and promptly clamped a big chain across the mouth of the inland channel, charging tolls for any vessel which wished to pass. The first real ocean-going ship to enter the port passed "Morgan's Point" in 1876.

By 1891 the channel had been purchased by the United States, and "a free Houston was thrown open to the world." The port was now ready for greater growth, and in 1901 an event was shaping up which was to give it, as well as other Texas ports, a gigantic boost.

In that year a well being drilled for oil in a cow pasture near Beaumont came in as the world's first "gusher," marking the birth of the Texas oil industry and the dawn of a new era—the machine age. Oil was discovered at Spindletop in quantities never believed possible, but some way had to be developed to get it to the markets of the world. Pipe lines, ports, and tanker ships provided the answer, and within a year oil from Texas was burning in Germany, England, Cuba, Mexico, New York, and Philadelphia! Soon tankers would be delivering oil from the Texas ports to all the world.

Chemicals for Calcutta are loaded at left below; cotton—one of Port Houston's leading exports—begins a journey across the sea at center; and at right a crane swings tubular goods for the oil industry from an ocean freighter's deck to dock.



Port of Houston offers dockage for 83 ships and 25 barges. These freighters at Long Reach Terminal, near the Turning Basin, load and unload such varied cargo as metals, cement, onions, flour, sulphur, canned meat, cattle, and dairy feeds.

In the feverish search for oil which followed Spindletop many of the early discoveries were in the Gulf Coast area near the ports—Saratoga, Batson, Humble, Sour Lake, Goose Creek—and pipe lines quickly connected their flowing well-heads to deep water outlets. Refineries to process this new flood of oil into useful products sprang up, and most of them, like the pipe line terminals, were located at the ports for access to water transportation.

As the oil industry grew, so did the Port of Houston. In 1910, citizens and city officials presented the "Houston plan" to Congress, a unique idea under which the city agreed to pay half the cost of deepening the channel to 25 feet. The proposal was accepted, and has since become a pattern for all such projects. The state legislature authorized Harris County to create a Navigation District, citizens voted bonds for half the cost of channel improvements, and the 25-feet deep waterway was completed in 1914. The Navigation District, governing body of the port, set out on a long-range development program which continues today.

More and more oil flowed through the port in the following years as each decade brought a greater growth of the Texas oil industry. East Central Texas, West Texas, and the Panhandle were the scene of important discoveries in the 1920's. The ship channel was dredged to 30 feet deep.

In 1930 came the discovery of the great East Texas field, followed by many others. Traffic on the channel leaped ahead with its deepening to 32 feet. Throughout the 1940's and up to date the increasing need for oil spurred the search for new fields, and crude oil production as well as pipe line and refining capacity was greatly increased.

As proved by its rank of Number 1 oil port in the world, the Port of Houston shared in this development of the Texas oil industry. Today various pipe lines deliver some 735,000 barrels of petroleum a day to the Port's refineries and docks. Humble Pipe Line Company alone brings in about one half of this amount through lines which stretch to almost every section of the state and into New Mexico.

The Port's refineries can process about 570 thousand barrels of crude oil a day. Almost half of this capacity—270 thousand barrels—is provided by Humble's Baytown refinery. The Humble docks on the Ship Channel at Baytown can load six tanker ships and six barges with crude oil and refined products at the same time.

With oil shipments increasing yearly, the Port of Houston earned the rank of second port in the nation in 1948,

OTHER PORTS OF TEXAS

A look at the map of Texas shows many apparently good natural harbors along the coast. Actually most are only shallow bays and bayous, and like the Port of Houston their development into deep-sea ports has been an engineering feat that cost hundreds of millions of dollars.

These ports perform a vital service for Texas and surrounding states to the north and west. This area produces a prodigious amount of raw materials—vastly more than its population can use—and the Texas ports are its doorways to the markets of the world.

Since Texas produces about 40 per cent of our national supply of crude oil, these harbors today are the United States' most important oil ports. Some 400 thousand barrels of crude oil and petroleum products are shipped out by tanker and barge each day, accounting for more than half of the Texas ports' traffic.

However, cotton, wheat, rice, forest products, sulphur, livestock and other products also contribute an enormous value.

Ships unloading steel, machinery, coffee, canned pineapple, and many other products are common sights at the Texas ports. Inbound shipping is not as great as outbound, but development of manufacturing industries in Texas is gradually bringing this inflow and outflow into balance.

The fourteen Texas ports are as follows:

Beaumont, Brownsville, Corpus Christi, Freeport, Galveston, Houston, Ingleside, Orange, Port Aransas, Port Arthur, Port Isabel, Port Lavaca, Sabine Pass, and Texas City.

a title it has since held with ever-larger cargoes. About three-fourths of these cargoes have been petroleum or petroleum products!

While oil thus forms the bulk of the Port of Houston's cargo, it has yet another important role. Petroleum must be called the father of industry in the Port area, and the Ship Channel the mother. Their offspring include a new petrochemicals empire and a burgeoning metals industry.

While the Ship Channel provided low-cost transportation facilities, the oil industry offered cheap and efficient fuel—especially natural gas—as well as raw materials for chemicals, plastics, synthetic rubber and fabrics, and many other products. Thus today the Ship Channel which was once a bayou is a magnificient "avenue of industry" which includes six refineries, 20 chemical plants, a steel mill, a pipe mill, four synthetic rubber plants, a ship repair yard, and many other major plants.

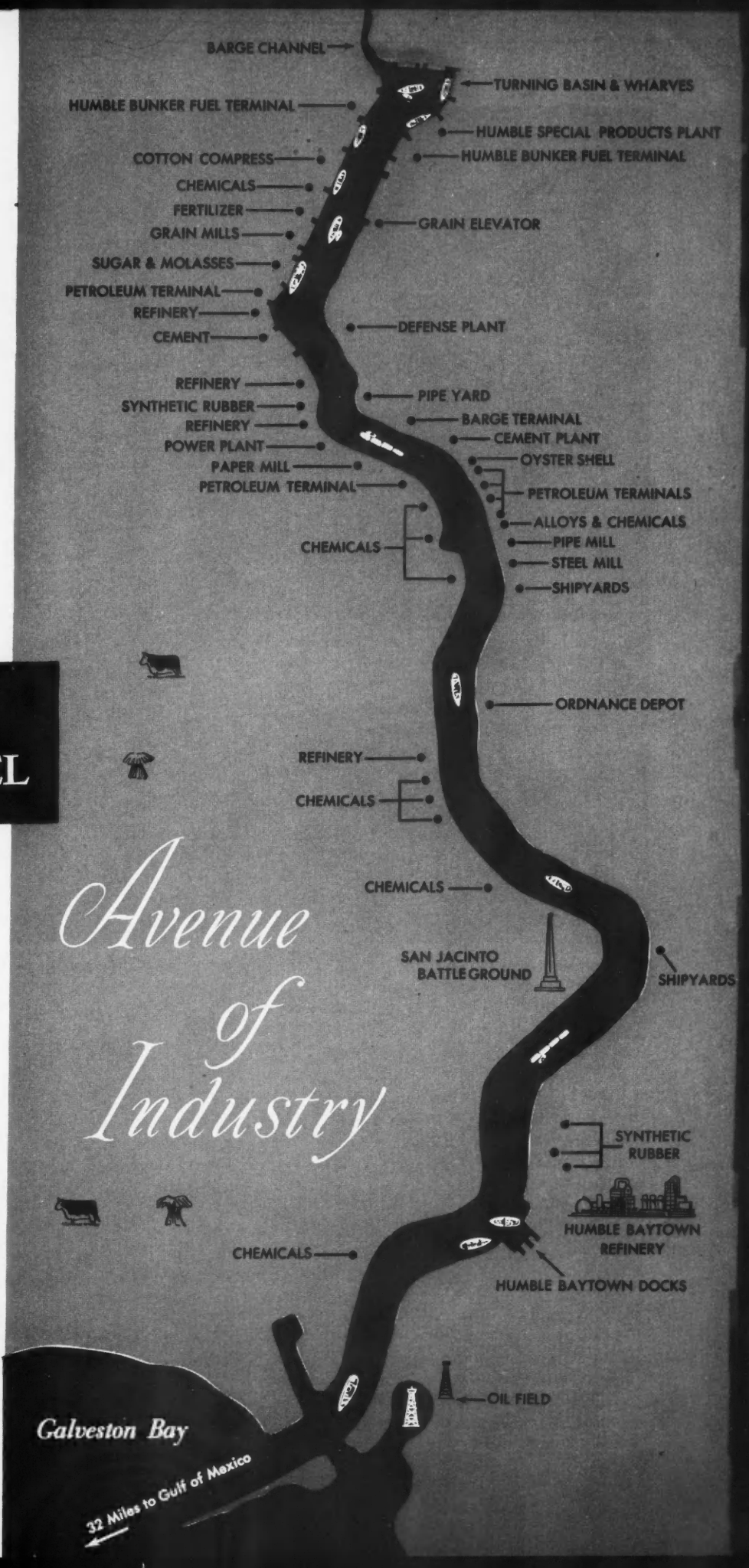
Capital investment in these plants exceeds a billion dollars, and the end is not in sight: plans for expansion of industry on the channel run into millions of dollars, and Port Houston's combination of "water and oil" continues to bring in new industries.

The port itself has plans—a $21 million plan to again widen the channel and to deepen it to 40 feet. Larger oil tankers—defense super-tankers—are being constructed to transport more oil, and the projected improvements will open the doors of the Port of Houston to these great new ships.

Port authorities estimate that the flow of petroleum through the port will jump 20 million tons in the next 10 years, and that development of the petrochemicals may make Houston the world's leading chemical port.

Second only to the mammoth natural Port of New York, the Port of Houston—50 miles from the sea—sets no boundary on its future commerce.

HOUSTON SHIP CHANNEL



Night falls, but loading operations continue at the Humble docks on the Houston Ship Channel. By morning these tankers may be bound for distant ports with full cargoes of crude oil, gasoline, jet airplane fuel, or many other petroleum products.

TANKER TURNAROUND

Humble's Baytown Docks load a third of Port Houston's cargo

FAST turnaround! That is the story of Humble's Baytown docks on the Houston ship channel, where tankers and barges are loaded with petroleum cargo.

Get 'em in, get 'em safely loaded, and get 'em out, "turned around" in minimum time for their voyage to the markets of the world.

Such safe and speedy operations enable a constant procession of oil vessels to load cargo at the Humble docks. In fact, so many tankers and barges nudge up to the Baytown docks that this single terminal loads *one-third* of all cargo handled by the leading oil port in the world—Port Houston.

During the past 12 months 2,867 tankers and barges have loaded at the docks—an around-the-clock average of about one every three hours!

At Humble's Baytown docks a tanker may be loaded not only with crude oil, but with almost any petroleum product you can name. Jet fuel or diesel oil, aviation gasoline or heating oil, solvents or lubricants—these and many other products are available, for the docks are part of the Humble Company's Baytown Refinery, one of the largest oil processing plants in the United States.

And service? The facilities serving these docks can pump a hundred thousand barrels of petroleum an hour, loading as many as six tankers and six barges at the same time. And whatever the ships' needs—money, mail, medical service, fuel and water, fresh food and milk, ropes, rigging, or repairs—they will be arranged for or supplied at the docks.

Such service for tanker ships requires much advance planning and work. The planners and workers in this case are the men and women in Humble's Marine Department, which acts as agent for most ships which tie up at the docks, and in the Refining Department, which supplies the petroleum cargo and actually "fills 'em up."

Their work usually begins 30 to 40 days before a tanker bound for Baytown enters the Gulf of Mexico.

Since some tankers load as many as 14 different grades of petroleum products and as much as 200,000 barrels, the Refining Department must make many advance arrangements in order to be ready. Cargo orders are received from the Marketing Department and are carefully checked as to quality, quantity, and for availability of berth space and facilities to load.

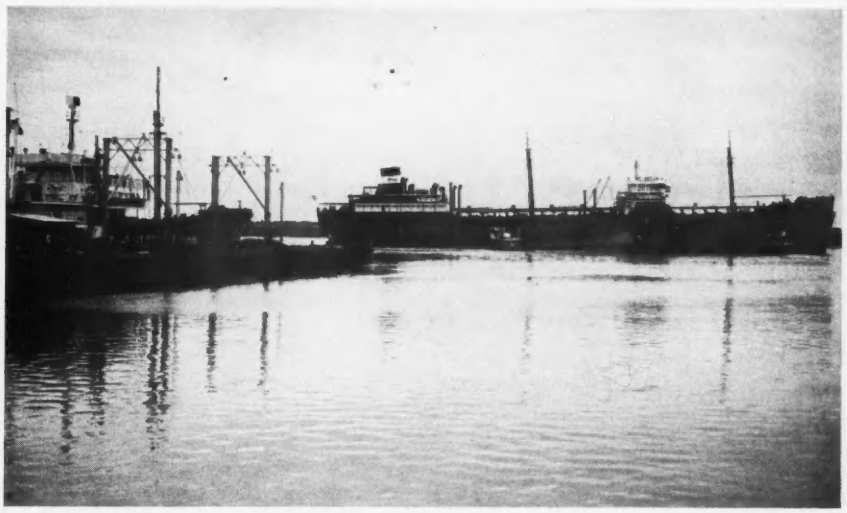
The different products ordered are "assembled" in different tanks by the Blenders; then checked for quality by the Inspectors; then released to the Pumpers and Gaugers for delivery by pipe line to the docks. Dockmen make connections and lay out hose before the ship arrives, and all equipment is ready to begin loading when the tanker pulls alongside.

About the time the tanker steams into the Gulf she radios her time of arrival to her representative in port, usually the Marine Department. This department immediately notifies the Dock Department and makes arrangements with pilots, tugs, and others for bringing the tanker safely in and out of port.

Food is ordered, new crewmen are alerted if needed, and all other services mentioned above, and many others, are arranged. The Marine Department and Dockmaster act as "ship's service men," and care for all the tankers' requirements while in port.

The moment a tanker secures her gangway to the dock the Marine Agent and Dockmaster go aboard to care for any last-minute services or changes, and dock employees begin "booming" the heavy loading hose into place. No time is lost, for tankers are built to *transport* oil and not to waste time at docks. Speed—safe speed—and coordination between the dock and ships' crews usually results in a fully-loaded tanker within 12 hours, and sometimes is as little as six hours!

The tankers sink deep in the water as the throbbing hose cease pumping. Hoses are uncoupled, quantity and quality of the petroleum cargo are again checked, tugs whistle, seamen cast off lines, and another tanker is on her way to the East Coast or to foreign ports, laden with oil to turn the wheels of the world.



Floating high in the water, her tanks empty, an oil tanker arrives at Humble's Baytown docks to load petroleum cargo. Ship at dock is loaded, ready to depart.

Swiftly and safely, the heavy hose which will pump cargo aboard are connected to the ship. Some tankers load more than 200 thousand barrels of petroleum.

Her "turnaround" completed, the heavy-laden tanker steams away. Her cargo may heat East Coast homes, power military airplanes overseas, or dry clean garments.

Eighteen Employees Retire

All have 20 years or more service;
seven have nearly third of a century

EIGHTEEN employees, representing more than 487 years' service, retired since the last HUMBLE WAY was published. All 18 employees have 20 years or more with Humble; seven have more than 30 years. Alpha E. Taylor, engineer at Baytown Pipe Line, is senior of this group of new annuitants in point of service with his almost 33 years with Humble.

HUMBLE PIPE LINE COMPANY

HARTLEY L. BROWN, telegraph operator at Longview Station, retired March 3 after more than 23 years' service. All of his service has been as a telegraph operator. Before joining Humble, he worked for Standard Oil Company of Louisiana and Standard Pipe Line Company. He has been at Longview since 1947. He owns a home in Longview, where he will live during retirement.

JOHN W. CHRISTIAN, field dispatcher at Midland Office, retired March 1 after 24 years' service. His entire employment with Humble has been in the West Texas Division.

ELMER O. DANIEL, engineer at Warda Station, retired April 1 after more than 31 years' service. He has worked for Humble as a machinist, laborer, labor foreman, pipeliner, and engineer. He includes among his special interests hunting. Mr. Daniel plans to move to Dodge, Texas, raise cattle, and farm.

GROVER A. EPPLER, district Warehouseman at Cisco, retired March 1 after more than 30 years' service. Except for five days spent at Gorman, Mr. Eppler served his career in the Cisco District. His interests are fishing and baseball. During retirement he will be with the Hurricane Glass Company at Freeport, but he plans to participate in his hobbies at will.

WILLIAM F. EVANS, field gauger at Tomball District, retired March 1 after more than 31 years' service. He was employed at Goose Creek as a laborer. He also worked at Hull, Dayton, Liberty, Bruni, Fairbanks, West Columbia, Palestine, Hempstead, and Raccoon Bend. Mr. Evans likes gardening and fishing. He will move to Bellville, where he will pursue his hobbies.

JOSEPH W. JOHNSON, pipe liner at Hawkins District, retired March 18 after 20 years' service. He joined Humble at Satsuma as a laborer. Later he worked as a watchman, welder, swamper, helper, assistant foreman, camp attendant, stock gauger, and pipe liner in various East Texas and Gulf Coast towns. Fishing and hunting are among his special interests. He plans to move to Houston and do some remodeling of his place in this city.

ALPHA E. TAYLOR, engineer at Baytown Pipe Line, retired March 26 after almost 33 years' service. He was employed as a laborer at Hearne. He also has worked at San Angelo, Kemper, Hawley, Ballinger, DeWalt, and Pierce Junction. Mr. Taylor likes to hunt and fish. He owns a home in Baytown, where he will live, but he plans to do some traveling.

BOB THOMAS, district gauger at Pampa, retired April 20 after more than 27 years' service. Except for the first few months with Humble, all of Mr. Thomas' service has been as a gauger in the North Texas Division at Iowa Park, Holliday, Wichita Falls, Olney, and Pampa. He plans to do some stock farming during retirement.

PRODUCTION DEPARTMENT

FLOYD A. DEBLANC, lease pumper-gauger at Thompsons, retired March 16 after 30 years' service. He started with Humble as a fireman, and later he worked as rotary helper, roustabout, painter, and lease pumper-gauger. Mr. DeBlanc bought 1000 acres near Liberty, Texas, where he will raise cattle. He will live in Liberty with his sister.

WILLIAM H. GREER, district superintendent at Vernon, retired April 1 after more than 30 years with Humble. Mr. Greer began as a roustabout; he also worked as toolpusher, gangpusher, pumper, and farm boss. Almost all of his service has been in Vernon and Ranger districts. He was in Ranger during its boom years. He will do some traveling during retirement.

BERRY W. HALES, machinist first at Friendswood, retired April 1 after almost 29 years' service. He worked for Humble as a machinist and machine shop foreman before becoming machinist first. His hobby is fishing. He plans to buy a

small amount of land and build a home in South Texas.

WILLIAM E. MILLER, lease pumper-gauger at Tomball, retired March 26 after more than 20 years' service. He started to work as a blacksmith helper. He also worked as a blacksmith, roustabout, roustabout gangpusher, truck and tractor driver, carpenter, and truck swamper. Mr. Miller was the first Company blacksmith at Conroe. On his initiative, he manufactured a pair of tongs used in sharpening fish-tail bits. He received a Coin-Your-Idea award for the tongs.

ARTHUR M. REECE, lease pumper-gauger at London, retired April 12 after more than 28 years' service. He was employed as a rotary helper at Powell. In July, 1931, he moved to London and later operated Humble's L. E. Coolidge Battery No. 1 in East Texas, the Company's first completely automatic tank battery. Operation of the unit was featured in the May-June, 1948, issue of THE HUMBLE WAY. Mr. Reece has purchased a home in South Houston, Texas, where he will live during retirement.

TOM SMITH, farm boss at Avoca District, retired February 27 after more than 31 years' service. All of his service with Humble has been in the North Texas Division. He has a few acres on which he plans to raise some stock and do some gardening.

BAYTOWN REFINERY

JOSEPH W. ANDERSON, pumper in the Docks Department, retired February 22 after 25 years' service. All of his service with Humble has been at Baytown refinery. He includes among his hobbies traveling and fresh-water fishing.

ZACK BALDWIN, laborer, retired March 25 after more than 26 years' service. All of his employment with Humble has been as a laborer, janitor, and teamster. His special interests include raising a garden and flowers. He lives at Baytown, but plans to spend some time with his brother on the family homestead at Dayton, Texas.

JOHN H. KING, barrel conveyor operator at the Compound Department, retired March 4 after more than 25 years' service. He worked for Humble Pipe Line Company at Goose Creek before joining the Baytown Refinery. He owns a home and land at Highlands, Texas.

HOUSTON OFFICE

HORACE R. BROWNE, telegraph operator in the Communications and Electrical Department of Humble Pipe Line, retired March 31 after more than 26 years' service. He began with Humble as an operator gauger at Navasota Station. December 24, 1926, he moved to Houston and remained there until 1932 when he went to Harbor Island for five years. He returned to Houston as oil dispatcher. His special interests include hunting, fishing and other outdoor sports.

Deaths

SINCE the last issue of THE HUMBLE WAY, eight active employees and ten annuitants have died.

Active employees who have died are: William L. Gaw, 60, engineer at Gilmer Station, on March 24; Aldred L. Noyes, 44, painter first at Baytown Refinery, on February 13; Francis T. Priour, 58, engineer at Skidmore Station, on March 2; Clyde M. Richard, 44, rotary fireman at North Katy, on February 10; Mrs. Helen R. Robinson, 48, receptionist in the Houston Office, on February 25; Barnett W. Weatherly, 54, maintenance helper at Baytown Refinery, on March 20; Robert C. Werner, 50, senior sales and technical service engineer in the Houston Office, on March 7; Earl D. West, 37, rotary driller, at Grand Isle, on March 14.

Annuitants: Joe E. Armstrong, 70, engineer at San Angelo before his retirement, died on February 26; Walter S. Bradley, 68, district superintendent at Conroe before his retirement, died October 18, 1952 (inadvertently omitted in earlier issue); James Y. Foster, 67, watchman at Talco District before his retirement, died on March 8; William H. Gates, 69, engineer at Chilton Station before his retirement, died February 19; Alex Johnson, 60, laborer at Baytown Refinery before his retirement, died on March 2; Charles F. Keyes, 60, toolpusher at Scott & Hopper District before his retirement, died March 14; Walter M. Looney, 69, pumper at Avoca District before his retirement, died February 17; Stephen F. Power, 68, assistant chief dispatcher at the Houston Office before his retirement, died March 13; George H. Spruce, 71, rate check and time posting clerk at Baytown Refinery before his retirement, died February 20; Edward H. Trull, 62, lease pumper-gauger at London before his retirement, died February 7; John M. Unsworth, 70, cooling tower tender at Baytown Refinery before his retirement, died March 8.

Employees Recently Called to Military Service

ARMY

Aiken, Edward E.	Comptrollers, Houston
Aiken, Edgar S.	Stationery & Printing, Houston
Bowden, Joe A.	Harbor Island Terminal—HPL
Branham, Bruce S.	Stationery & Printing, Houston
Brock, Billy L.	Mail Room, Houston
Coker, Delbert E.	Refinery RuR SR 43 Accounting
Duty, Harley E.	Hardin District, Production
English, Harlan N.	Colorado District, Production
Fuchs, Jimmie R.	Geologic Research, Houston
Gouchie, Thomas E.	Exploration Geophysics, Texas
Griffin, John H.	Lovell Lake District, Production
Hanks, Harry S.	Wink District, Production
Hendrix, Joe M.	Advertising, Houston
Hochenauer, John D., Jr.	Sales Accounting, Houston
Mustachia, Michael	Production Accounting, Houston
Parker, Don L.	Mail Room, Houston
Redwine, Harold L.	Comptrollers, Houston
Via, Reuben J., Jr.	Stratton District, Production
Whitt, Donald L.	Exploration Geophysics, Florida

AIR FORCE

Dunks, Willis S.	Refinery RuR SR 43 I. N. B.

NAVY

Toliver, Willie J.	Galveston Bulk Station, Sales

COAST GUARD

Rawley, Edward C.	Stationery & Printing, Houston

By the way...

SAFETY AWARDS PRESENTED

R. B. Roaper, chief safety engineer, center, presents TSA safety award scrolls to (l to r) Gordon Farned, Frank A. Watts, R. C. Barbour, and John O. Sue.

Awards were presented to four Humble Oil & Refining Company executives March 31 by the Texas Safety Association for the Company's outstanding safety achievements during 1952. The awards were given during the Fourteenth Annual Texas Safety Conference in the Rice Hotel in Houston.

R. B. Roaper, Humble's chief safety engineer and a founder of the Texas Safety Association, presented the award scrolls to Company men and to a number of others representing their own industrial concerns. All of Humble's awards were in Group 3, which included organizations whose employees have more than 800,000 hours per year of exposure to potential hazards.

J. O. Sue, the Company's natural gas superintendent, received the award for his division's winning record in the petroleum-natural gas classification. R. C. Barbour, manager of the Production Department, accepted awards in the petroleum-drilling and petroleum-production categories. Sales Manager Frank A. Watts was given the award in the petroleum-marketing group. Gordon L. Farned, manager of Humble's Baytown plants, received the petroleum-refining award.

HUMBLE'S DEEPEST WELL COMPLETED

The deepest well ever drilled by the Humble Company was completed as a condensate producer during the month of April.

It is the No. 1 H. P. Gonsoulin, located in the Weeks Island field, Iberia Parish, coastal Louisiana. The well was completed through perforations from 17,080-113 feet deep.

It is one of only two wells in the world to produce from below seventeen thousand feet. Six months of around-the-clock drilling operations were required to reach the well's total depth—17,403 feet. It was drilled from a barge-mounted rig (No. 45) in a location dredged for the purpose.

On a 3/16 inch choke, the well produced at the rate of 192 barrels of 44.6 gravity oil and 4,777 Mcf of gas per day. Gas-oil ratio was 24,920.

Christmas tree, No. 1 H. P. Gonsoulin

Humble now has 32 wells in the Weeks Island field, with production ranging from 5,700 feet to the deep well just completed.

The HUMBLE WAY

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Published every other month for employees and stockholders

HUMBLE OIL & REFINING COMPANY

P. O. Box 2180, Houston 1, Texas

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Concerted action on the derrick floor during a "round trip" to change bits shows the concentration, the intentness, the high degree of teamwork it takes to make a drilling crew.

Spell petrochemical the easy way...

P-R-O-G-R-E-S-S

Progress in finding and producing oil is an old story to the oil country. Nearly everybody has heard about the oil industry's day-to-day miracles in exploration and production.

Now we all have a new series of miracles to wonder at — the transformation of petroleum hydrocarbons into chemical products of astonishing variety. These chemicals from petroleum have even added a new word to the American vocabulary — *petrochemical.*

Progress in the field has been amazing. The capital investment in new industries based on the petrochemicals has mounted to hundreds of millions. The new plants have created thousands of new jobs. And petrochemicals, as an industry, have provided a wider, a more complete, use of the country's oil resources.

Butadiene and butyl for synthetic rubber, toluene for TNT, solvents, aldehydes, and many other petrochemicals — even alcohols—are now produced in oil refineries. For example, the Humble Company, at its Baytown, Texas, refinery, is building facilities to manufacture paraxylene, the raw material for the new fabric called *dacron.*

The day may come, and very quickly, when you can be clothed from tip to toe in synthetic fabrics derived from petroleum; when petrochemicals provide the rubber for your tires, the plastics for your car's interior fittings, the fabric for the seat covers, the vehicle for body paint and polish.

The petrochemicals spell *progress* . . . progress to which the oil industry contributes research, capital, manufacturing facilities and, most importantly, an enterprising spirit.

HUMBLE OIL & REFINING CO.
HUMBLE PIPE LINE CO.

(This advertisement is one of a series which has been appearing in Texas newspapers and magazines. Similar advertisements were also published in other states in which Humble carries on operations.)